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TITLE: Handy generator has speed up mechanism for rotor and clutch mechanism to control the torque when input torque exceeds fixed value

PATENT-ASSIGNEE: SONY CORP[SONY]

PRIORITY-DATA: 1999JP-0086552 (March 29, 1999)

PATENT-FAMILY:

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ABSTRACTED-PUB-NO: JP2000287499A

BASIC-ABSTRACT:

NOVELTY - A speed up gear (5) provided with the rotation input unit (8) increases the speed of rotor. The stator has magnetic circuit. A control unit limits voltage output from coil of stator and changes the torque required. The clutch mechanism (20), provided between input portion and speed up gear makes rotation input portion idle, when the input torque exceeds fixed value, based on the output of control unit.

USE - Small generator, operated by hand.

ADVANTAGE - Large amount of rotation input can be prevented, thereby damage of circuit can be prevented and reliable generator can be obtained.

DESCRIPTION OF DRAWING(S) - The figure shows the vertical side view of the generator.

Speed up gear 5

Rotation input unit 8

Clutch mechanism 20

CHOSEN-DRAWING: Dwg.1/8

TITLE-TERMS: HANDY GENERATOR SPEED UP MECHANISM ROTOR
CLUTCH MECHANISM CONTROL
TORQUE INPUT TORQUE FIX VALUE

DERWENT-CLASS: V06

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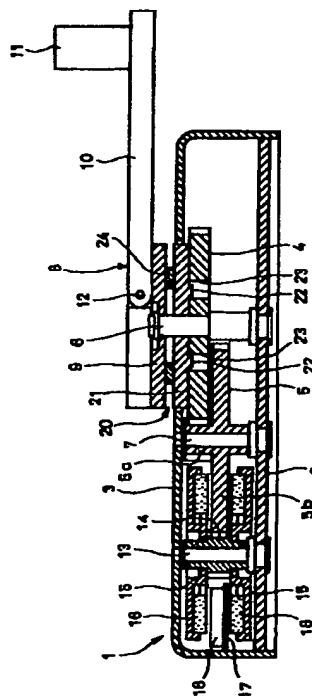
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(54) 【発明の名称】 発電機

(57) 【要約】

【課題】 回転入力部（ハンドル）8を手で回して発電を行なう小型発電機1において、回転入力部8の過度な回転入力による機構部や回路部の破損を防止する。

【解決手段】 回転入力部8を過度な速さで回転させるとクラッチ機構20が動作して回転入力部8が空回りする構造とする。



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【特許請求の範囲】

【請求項1】 回転入力部から入力された回転を増速する増速機構と、

この増速機構により高速回転される磁石を有するロータ部と、

このロータ部の磁石とギャップを介して磁気回路を構成するコイルを有するステータ部と、

このステータ部のコイルから出力される電圧を制限し、上記回転入力部の入力に必要なトルクを変化させる制御回路と、

上記回転入力部と上記増速機構との間に設けられ、上記トルクが一定の値を越えると上記回転入力部を空回りさせるクラッチ機構と、を備えてなる発電機。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は発電機に関し、特に手動の小型発電機において過度な入力を抑制するための構成に係るものである。

【0002】

【従来の技術】現在一般に実用化されている手動の小型発電機は、回転入力部から入力された回転を増速する増速機構と、この増速機構により高速回転される磁石を有するロータ部と、このロータ部の磁石と対向して配されるコイルを有するステータ部と、を備えて構成されている。

【0003】増速機構は複数のギアを組み合わせてなり、回転入力部から入力された回転を数十倍に増速してロータ部に伝達する。

【0004】ロータ部の磁石はその回転方向にN極とS極が交互に着磁されており、一方ステータ部のコイルは磁石の回転方向に複数個が配置され、磁石との間で磁気回路を構成している。

【0005】そして増速機構により磁石が高速回転されると、磁石とコイルとの間の磁気作用によってコイルに起電力が生じて発電が行なわれるものである。

【0006】

【発明が解決しようとする課題】上記の如く構成される従来の発電機では、操作者は回転入力部をどの程度の速さで回せば適当であるのかわからず、そのため回転入力部を過度な速度で回しすぎて機構部に過剰な力が加わって機構部品を破損したり、回路部に過剰な電圧が加わって回路を破損したりするおそれがあった。本発明はこのような問題点を解消することを課題としてなされたものである。

【0007】

【課題を解決するための手段】上記の課題を解決するものとして本発明の発電機は、回転入力部から入力された回転を増速する増速機構と、この増速機構により高速回転される磁石を有するロータ部と、このロータ部の磁石とギャップを介して磁気回路を構成するコイルを有する

ステータ部と、このステータ部のコイルから出力される電圧を制限し、回転入力部の入力に必要なトルクを変化させる制御回路と、回転入力部と増速機構との間に設けられ、上記トルクが一定の値を越えると回転入力部を空回りさせるクラッチ機構と、を備えてなるものである。

【0008】このように構成される本発明の発電機では、回転入力部を過度な速度で回しすぎた場合にはクラッチ機構が動作して回転入力部が空回りするので、操作者は回転入力部の速度を下げて適正な速度で回して発電を行なうことができる。

【0009】

【発明の実施の形態】以下、図面を参照しながら本発明の実施の形態例について詳細に説明する。

【0010】図1及び図2において1は本発明による手動の小型発電機を全体として示し、2はその基盤となるベース板、3はこのベース板2を覆うカバーで、このカバー3の内部に収まる状態でベース板2上に、回転入力部から入力された回転を増速する増速機構と、この増速機構により高速回転される磁石を有するロータ部と、このロータ部の磁石とギャップを介して磁気回路を構成するコイルを有するステータ部と、が備えられている。

【0011】先ず増速機構について説明すると、この増速機構は回転入力ギア4と増速ギア5とを有して構成される。この回転入力ギア4と増速ギア5は、夫々ベース板2に立設固定された固定軸6と7に回転可能に軸支されている。

【0012】回転入力ギア4にはクラッチ機構20を介して回転入力部としてのハンドル8が組み付けられている。このハンドル8は、回転入力ギア4と共に固定軸6に回転可能に組み付けられるジョイント9と、このジョイント9から外周方向に延びるレバー10とによりなり、このレバー10の先端部にはツマミ11が設けられ、このツマミ11を手で持ってハンドル8を回すことによりこれと一体に回転入力ギア4が回転されるものである。尚、このハンドル8においてレバー10は、ジョイント9に対し軸12を支点として180°折り返しが可能であり、これによってツマミ11の部分が収納可能な構造となされている。

【0013】このハンドル8と回転入力ギア4との間に構成されるクラッチ機構20については、後に詳しく説明する。

【0014】増速ギア5は小径ギア部5aと大径ギア部5bとが一体に形成されてなり、小径ギア部5aは回転入力ギア4と噛合し、一方大径ギア部5bはロータ部のギア14と噛合して、回転入力ギア4の回転を数十倍に増速してロータ部に伝達する働きを有している。

【0015】ロータ部は、ベース板2に立設固定された固定軸13に回転可能に軸支されるギア14と、このギア14と一体に回転する円板状の回転ヨーク15と、この回転ヨーク15に固定されるリング状の磁石16と、

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により構成されている。尚、本例の発電機1においては、このロータ部の回転ヨーク15と磁石16は上下に2組が対向して設けられている。

【0016】このロータ部の磁石16はその回転方向にN極とS極が交互に複数極着磁されており、この磁石16とアキシャル方向(回転軸方向)に対向してステータ部が配置されている。

【0017】このステータ部は、回路基板17の上に上記磁石16とアキシャル方向のギャップを介して磁気回路を構成するコイル18を備えてなる。このコイル18は磁石16の回転方向に複数個が配置され、ロータ部の磁石16が高速回転されると磁石16とコイル18との間の磁気作用によってコイル18に起電力が生じて発電が行なわれるものである。

【0018】以上の如く構成される発電機1において特に本例では、回転入力部であるハンドル8と増速機構の回転入力ギア4との間に、過度の回転入力を抑えるためのクラッチ機構20が設けられている。

【0019】このクラッチ機構20は、ハンドル8のジョイント9と回転入力ギア4との間において固定軸6に回転可能に組み付けられるクラッチ板21を有してなる。このクラッチ板21はハンドル8と一体に回転されるようになっており、その下面側には図3に示す如く周方向に複数の突起22が等間隔で突出形成されている。

【0020】これに対応して回転入力ギア4には図4に示す如く周方向に同数の穴23が等間隔で形成されており、この穴23に上記クラッチ板21の突起22に係合するようになっている。尚、ここで図5に示す如くクラッチ板21の突起22は、クラッチ板21の回転方向に円弧状となる突出形状に形成されている。

【0021】ハンドル8のジョイント9とクラッチ板21の間には弾性部材としてウェーブワッシャ24が介挿されており、このウェーブワッシャ24の弾性力によりクラッチ板21は下方向即ち回転入力ギア4に押し付けられる方向に偏倚され、これによってクラッチ板21の突起22と回転入力ギア4の穴23との係合が維持される構造となっている。

【0022】このように通常の状態ではクラッチ板21の突起22と回転入力ギア4の穴23とが係合されており、このためハンドル8を回すとこれと一体に回転入力ギア4が回転されて発電が行なわれる。

【0023】そしてハンドル8が過度の回転速度で回された場合にはクラッチ機構20が動作し、即ちハンドル8と一体にクラッチ板21が回転入力ギア4に対し過度に回転しようとする力によってウェーブワッシャ24が撓んでクラッチ板21の突起22が回転入力ギア4の穴23から外れ(このとき突起22は図5に示す如くクラッチ板21の回転方向に円弧状となる突出形状に形成されていることによりスムーズに穴23から外れる)、このためハンドル8が回転入力ギア4に対し空回りするよ

うに動作する。

【0024】この動作においてクラッチ機構20は、発電機内の回路基板上に構成される制御回路との組み合わせによって動作されるものである。

【0025】この制御回路を図6に示す。この回路では、コイル18で発電された電圧(この場合3個のコイルによる3相電圧)が整流部30のダイオードで直流電圧に整流され、この電圧がDCDCコンバータ31で例えば5Vにダウンコンバートされて出力される。

10 【0026】本例ではこの回路において整流部30とDCDCコンバータ31との間に電圧制限部32を設けている。この電圧制限部32はツェナーダイオードD₁とトランジスタQ₁を有してなり、整流電圧がツェナーダイオードD₁で設定した電圧に達するとトランジスタQ₁に多くの電流が流れることによってコイル抵抗が増え、コイル抵抗による内部電圧降下が大きくなり、電圧が制限される如く動作するものである。

【0027】即ち、ハンドル8を回して発電を行なうと、図7に示す如くハンドルの回転数に比例して整流電圧が発生し、ここで電圧制限部32が動作する電圧をツェナーダイオードD₁により例えば1.4Vに設定すると、整流電圧が1.4Vとなったところで電圧制限部32の動作でトランジスタQ₁に多くの電流が流れて電圧が制限される。

【0028】このように電圧が制限されると、コイル電流が増し、磁石の回転を妨げる向きの力が大きくなり、このためハンドル8の回転入力に必要なトルクが大きくなる。

30 【0029】即ち、図8に示す如くハンドルの回転数が適正な回転数である120~180rpmを越えると急激にハンドル8の回転入力に必要なトルクが大きくなり、つまりハンドル8を回す操作が重くなる。

【0030】ここで例えばクラッチ機構20の動作点をおおよそ1.5kgcmに設定すると、上記トルクが1.5kgcmを越えたところでクラッチ板21の突起22が回転入力ギア4の穴23から外れてハンドル8が空回りする状態となり、発電が停止される。

【0031】そしてこのような状態となると操作者は、ハンドル8を過度な速度で回しすぎたことに気付き、ハンドル8を回す速度を下げて適正な回転数である120~180rpmで発電を続けることができる。

【0032】このように本例の発電機1では、ハンドル8をどの程度の速さで回せば適当であるかがわかり易く、そのため過度な回転入力を抑制することができるので、機構部に過剰な力が加わってこれを破損したりするおそれはない。また回路部ではDCDCコンバータ31の入力最大定格電圧を越えることがないので信頼性が上がり、またここではDCDCコンバータ31の入力最大定格電圧を必要以上に高くする必要がなくICコストを下げることができる。さらに回路部では発熱が大きくな

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らずに済むので放熱板が不要であり、小型化に有利となるものである。

【0033】以上、本発明の実施の形態の一例について説明したが、本発明はこの例の構成に限定されことなく他にも種々の実施形態を採り得るものであることは言うまでもない。

【0034】

【発明の効果】以上に説明した如く本発明の発電機では、回転入力部をどの程度の速さで回せば適当であるのかがわかり易い。そのため過度な回転入力を抑制することができるので、機構部や回路部の破損を確実に防止することができ、信頼性の高い発電機を提供できるものである。

【図面の簡単な説明】

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【図1】本発明による発電機の縦断側面図である。

【図2】同、上面図である。

【図3】同、クラッチ板の下面図である。

【図4】同、回転入力ギアの上面図である。

【図5】同、クラッチ機構の要部の縦断面図である。

【図6】同、制御回路を示す回路図である。

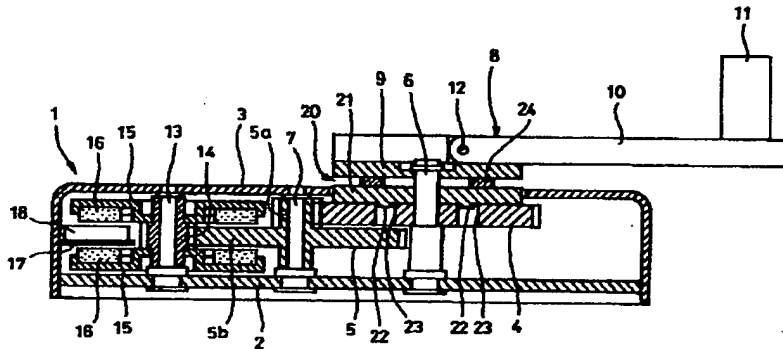
【図7】同、整流電圧—回転数の特性図である。

【図8】同、トルク—回転数の特性図である。

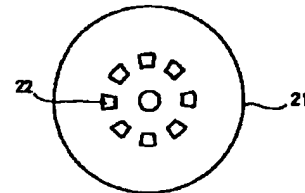
【符号の説明】

1…発電機、4…回転入力ギア、5…増速ギア、
8…ハンドル（回転入力部）、16…磁石、18…
コイル、20…クラッチ機構、21…クラッチ
板、22…突起、23…穴、24…ウェーブワッ
シャ

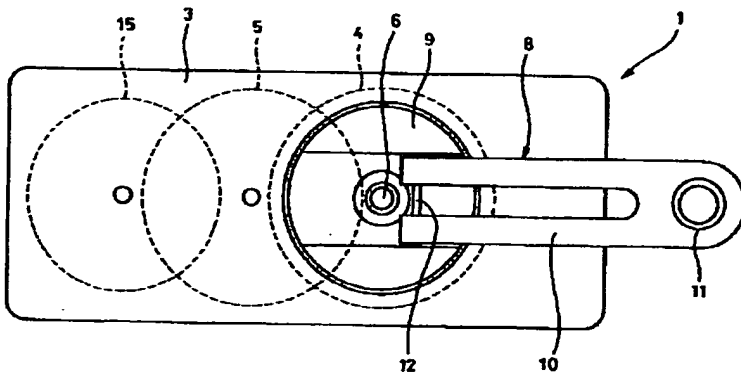
【図1】



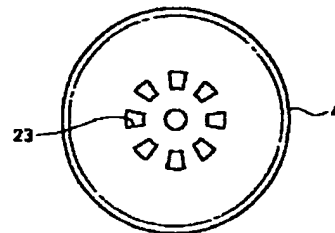
【図3】



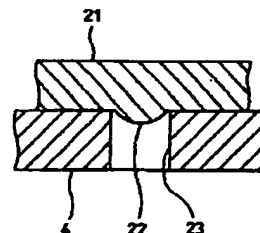
【図2】



【図4】

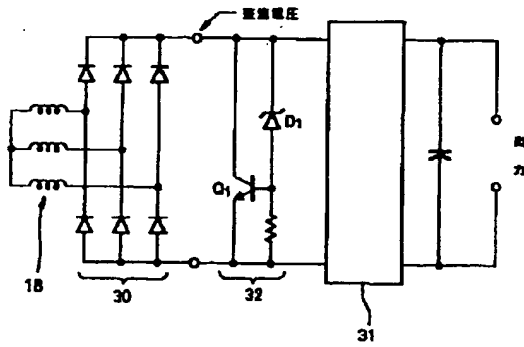


【図5】

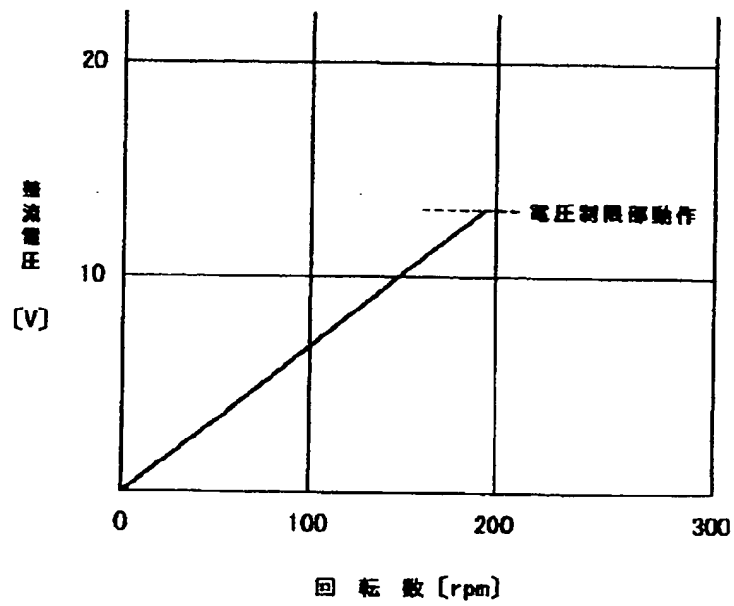


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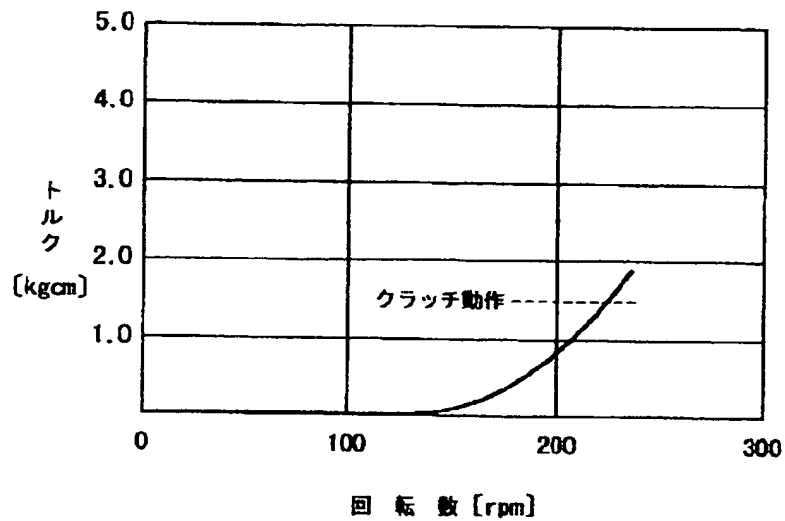
【図6】



【図7】



【図8】



フロントページの続き

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 AB15 CA18 CB01 CB10 CC02
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 CC03 CC07 DD03 EE02 EE24
 GG01 GG09
 5H621 AA03 BB02 JK01

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the configuration for controlling too much input in a manual small generator especially about a generator.

[0002]

[Description of the Prior Art] The manual small generator put in practical use by the current general ones is equipped with the speed-increasing system which accelerates the revolution inputted from the revolution input section, the Rota section which has the magnet in which a high-speed revolution is carried out by this speed-increasing system, and the stator section which has the coil which counters with the magnet of this Rota section and is arranged, and is constituted.

[0003] A speed-increasing system accelerates the revolution which came to combine two or more gears and was inputted from the revolution input section dozens times, and transmits it to the Rota section.

[0004] As for the magnet of the Rota section, N pole and the south pole are magnetized by turns by the hand of cut, on the other hand, plurality is arranged in a magnetic hand of cut, and the coil of the stator section constitutes the magnetic circuit between magnets.

[0005] And if the high-speed revolution of the magnet is carried out by the speed-increasing system, by the magnetic action between a magnet and a coil, electromotive force will arise in a coil and a generation of electrical energy will be performed.

[0006]

[Problem(s) to be Solved by the Invention] With the conventional generator constituted like the above, when turning the revolution input section with what speed, it did not understand whether it would be suitable, therefore the revolution input section was turned too much at too much rate, the superfluous force joined the device section, and the operator had a possibility of damaging a mechanism element, or a superfluous electrical potential difference having joined the circuit section, and damaging a circuit. It makes as a technical problem that this invention cancels such a trouble.

[0007]

[Means for Solving the Problem] As what solves the above-mentioned technical problem, the generator of this invention The speed-increasing system which accelerates the revolution inputted from the revolution input section, the Rota section which has the magnet in which a high-speed revolution is carried out by this speed-increasing system the stator section which has the coil which constitutes a magnetic circuit through the magnet and gap of this Rota section, If the electrical potential difference outputted from the coil of this stator section is restricted, it is prepared between the control circuit to which torque required for the input of the revolution input section is changed, and the revolution input section and a speed-increasing system and the above-mentioned torque exceeds a fixed value, it will come to have the clutch device in which the revolution input section is made to idle.

[0008] Thus, with the generator of this invention constituted, since a clutch device operates and the revolution input section idles when the revolution input section is turned too much at too much rate, an operator can generate electricity by lowering the rate of the revolution input section and turning at a proper rate.

[0009]

[Embodiment of the Invention] Hereafter, the example of a gestalt of operation of this invention is explained to a deterring to a drawing.

[0010] The base plate with which 1 shows the manual small generator by this invention as a whole in drawing 1 and drawing 2, and 2 becomes that base, and 3 are wrap coverings about this base plate 2. The speed-increasing system which accelerates the revolution inputted from the revolution input section on the base plate 2 in the condition of fitting the interior of this covering 3, It has the Rota section which has the magnet in which a high-speed revolution is

carried out by this speed-increasing system, the stator section which has the coil which constitutes a magnetic circuit through the magnet and gap of this Rota section, and **.

[0011] When a speed-increasing system is explained first, this speed-increasing system has the revolution input gear and the accelerating gear 5, and is constituted. This revolution input gear 4 and the accelerating gear 5 are supported to revolve by the base plate 2 pivotable at the fixed shafts 6 and 7 by which set-up immobilization was carried out, respectively.

[0012] The handle 8 as the revolution input section is attached to the revolution input gear 4 through the clutch device 20. This handle 8 becomes by the fastener 9 attached to the fixed shaft 6 pivotable with the revolution input gear 4, and the lever 10 prolonged in the direction of a periphery from this fastener 9, a knob 11 is formed in the point of this lever 10, and the revolution input gear 4 rotates to this and one by having this knob 11 by hand and turning a handle 8. In addition, in this handle 8, to the fastener 9, 180-degree clinch is possible for a lever 10, and it is made by this by using shaft 12 as the supporting point with the structure which can contain the part of a knob 11.

[0013] The clutch device 20 constituted between this handle 8 and the revolution input gear 4 is explained in detail later.

[0014] It comes to form minor diameter gear section 5a and major-diameter gear section 5b in one, and minor diameter gear section 5a gears with the revolution input gear 4, on the other hand, major-diameter gear section 5b gears with the gear 14 of the Rota section, and the accelerating gear 5 has the work which the revolution of the revolution input gear 4 is accelerated dozens times, and is transmitted to the Rota section.

[0015] The Rota section resembles the magnet 16 of the shape of a ring fixed to the gear 14 supported to revolve pivotable at the fixed shaft 13 by which set-up immobilization was carried out, this gear 14 and the disc-like revolution yoke 15 which rotates to one, and this revolution yoke 15 by the base plate 2, and is constituted more. In addition, in the generator 1 of this example, up and down, 2 sets counters and the revolution yoke 15 and magnet 16 of this Rota section are formed.

[0016] Two or more pole magnetization of N pole and the south pole is carried out by turns in that hand of cut, the magnet 16 of this Rota section counters in this magnet 16 and the axial direction (the direction of a revolving shaft), and the stator section is arranged.

[0017] This stator section comes to have the above-mentioned magnet 16 and the coil 18 which constitutes a magnetic circuit through the gap of the axial direction on the circuit board 17. If plurality is arranged in the hand of cut of a magnet 16 and the high-speed revolution of the magnet 16 of the Rota section is carried out, by the magnetic action between a magnet 16 and a coil 18, electromotive force will arise in a coil 18 and, as for this coil 18, a generation of electrical energy will be performed.

[0018] Especially in the generator 1 constituted, the clutch device 20 for suppressing too much revolution input is established by this example between the handles 8 and the revolution input gears 4 of a speed-increasing system where the revolution input section like the above.

[0019] This clutch device 20 comes to have the clutch plate 21 attached to the fixed shaft 6 pivotable between the fastener 9 of a handle 8, and the revolution input gear 4. As this clutch plate 21 rotates to a handle 8 and one and it is shown in that underside side at drawing 3, projection formation of two or more projections 22 is carried out at equal intervals in the hoop direction.

[0020] As shown in the revolution input gear 4 at drawing 4 corresponding to this, the hole 23 of the same number is formed in the hoop direction at equal intervals, and the projection 22 of the above-mentioned clutch plate 21 engages with this hole 23. In addition, as shown in drawing 5 here, the projection 22 of a clutch plate 21 is formed in the hand of cut of a clutch plate 21 at the projection configuration which becomes circular.

[0021] Between the fastener 9 of a handle 8, and the clutch plate 21, the wave washer 24 is inserted as an elastic member, and it deflects in the direction in which a clutch plate 21 is pushed against down [4], i.e., a revolution input gear, by the elastic force of this wave washer 24, and has the structure where engagement in the projection 22 of a clutch plate 21 and the hole 23 of the revolution input gear 4 is maintained by this.

[0022] Thus, in the usual condition, the projection 22 of a clutch plate 21 and the hole 23 of the revolution input gear are being engaged, if a handle 8 is turned for this reason, the revolution input gear 4 will rotate to this and one, and a generation of electrical energy will be performed to them.

[0023] And when a handle 8 is turned with too much rotational speed, the clutch device 20 operates. According to namely, the force which a clutch plate 21 tends to rotate too much to the revolution input gear 4 to a handle 8 and on the wave washer 24 bends and the projection 22 of a clutch plate 21 separates from the hole 23 of the revolution input gear 4 (it separates from projection 22 from a hole 23 smoothly by being formed in the hand of cut of a clutch plate 21 at the projection configuration which becomes circular, as shown in drawing 5 at this time). For this reason, it operates so that a handle 8 may idle to the revolution input gear 4.

[0024] In this actuation, the clutch device 20 operates with combination with the control circuit constituted on the

circuit board in a generator.

[0025] This control circuit is shown in drawing 6. In this circuit, the electrical potential difference (three-phase-circuit electrical potential difference according to three coils in this case) generated with the coil 18 is rectified by direct current voltage for the diode of the rectification section 30, by DC-DC converter 31, a down convert is carried out and this electrical potential difference is outputted to 5V.

[0026] In this example, the voltage-limiting section 32 is formed between the rectification section 30 and DC-DC converter 31 in this circuit. This voltage-limiting section 32 is zener diode D1. Transistor Q1 It comes to have and a rectification electrical potential difference is zener diode D1. When the set-up electrical potential difference is reached it is a transistor Q1. When many currents flow, coil resistance increases and the internal voltage drop by coil resistance becomes large, and it operates so that an electrical potential difference may be restricted.

[0027] That is, when it generates electricity by turning a handle 8, it is zener diode D1 about the electrical potential difference on which a rectification electrical potential difference occurs in proportion to the rotational frequency of a handle as shown in drawing 7, and the voltage-limiting section 32 operates here. When it is set as 14V, it is a transistor Q1 by actuation of the voltage-limiting section 32 in the place where the rectification electrical potential difference became 14V. Many currents flow and an electrical potential difference is restricted.

[0028] Thus, if an electrical potential difference is restricted, the force of the sense in which a coil current bars a revolution of increase and a magnet will become large, and, for this reason, torque required for the revolution input of a handle 8 will become large.

[0029] That is, if the rotational frequency of a handle exceeds 120 which is a proper rotational frequency - 180rpm as shown in drawing 8, torque rapidly required for the revolution input of a handle 8 will become large, that is, actuation of turning a handle 8 becomes heavy.

[0030] If the operating point of the clutch device 20 is about set as 1.5kgcm(s) here, it will be in the condition that the projection 22 of a clutch plate 21 separates from the hole 23 of the revolution input gear 4 in the place where the above mentioned torque exceeded 1.5kgcm(s), and a handle 8 idles, and a generation of electrical energy will be suspended.

[0031] And when it comes to such a condition, an operator notices having turned the handle 8 too much at too much rate, can lower the rate which turns a handle 8 and can continue a generation of electrical energy by 120 which is a proper rotational frequency - 180rpm.

[0032] Thus, since whether it is suitable can control too much revolution input intelligibly therefore with the generator of this example if a handle 8 is turned with what speed, there is no possibility of the superfluous force joining the device section and damaging this. Moreover, since the input maximum rating electrical potential difference of DC-DC converter 31 is not exceeded, dependability can go up by the circuit section, and it is not necessary to make the input maximum rating electrical potential difference of DC-DC converter 31 high beyond the need here, and IC cost can be lowered. Furthermore, since generation of heat does not need to become large in the circuit section, a heat sink is unnecessary and it becomes advantageous to a miniaturization.

[0033] As mentioned above, although an example of the gestalt of operation of this invention was explained, it cannot be overemphasized that it is what can otherwise take various operation gestalten, without limiting this invention to the configuration of this example.

[0034]

Effect of the Invention] If the revolution input section is turned with what speed with the generator of this invention explained above, it is intelligible whether it is suitable. Therefore, since too much revolution input can be controlled, leakage of the device section or the circuit section can be prevented certainly, and a reliable generator can be offered.

Translation done.]

*** NOTICES ***

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Begin Translation:

CLAIMS

[Claim(s)]

[Claim 1] The speed-increasing system which accelerates the revolution inputted from the revolution input section, and the Rota section which has the magnet in which a high-speed revolution is carried out by this speed-increasing system, The stator section which has the coil which constitutes a magnetic circuit through the magnet and gap of this Rota section, The control circuit to which the electrical potential difference outputted from the coil of this stator section is restricted, and torque required for the input of the above-mentioned revolution input section is changed, The generator which comes to have the clutch device in which the above-mentioned revolution input section is made to idle when it is prepared between the above-mentioned revolution input section and the above-mentioned speed-increasing system and the above-mentioned torque exceeds a fixed value.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the configuration for controlling too much input in a manual small generator especially about a generator.

[0002]

[Description of the Prior Art] The manual small generator put in practical use by the current general one is equipped with the speed-increasing system which accelerates the revolution inputted from the revolution input section, the Rota section which has the magnet in which a high-speed revolution is carried out by this speed-increasing system, and the stator section which has the coil which counters with the magnet of this Rota section and is arranged, and is constituted.

[0003] A speed-increasing system accelerates the revolution which came to combine two or more gears and was inputted from the revolution input section dozens times, and transmits it to the Rota section.

[0004] As for the magnet of the Rota section, N pole and the south pole are magnetized by turns by the hand of cut, on the other hand, plurality is arranged in a magnetic hand of cut, and the coil of the stator section constitutes the magnetic

circuit between magnets.

[0005] And if the high-speed revolution of the magnet is carried out by the speed-increasing system, by the magnetic action between a magnet and a coil, electromotive force will arise in a coil and a generation of electrical energy will be performed.

[0006]

[Problem(s) to be Solved by the Invention] With the conventional generator constituted like the above, when turning the revolution input section with what speed, it did not understand whether it would be suitable, therefore the revolution input section was turned too much at too much rate, the superfluous force joined the device section, and the operator had a possibility of damaging a mechanism element, or a superfluous electrical potential difference having joined the circuit section, and damaging a circuit. It makes as a technical problem that this invention cancels such a trouble.

[0007]

[Means for Solving the Problem] As what solves the above-mentioned technical problem, the generator of this invention The speed-increasing system which accelerates the revolution inputted from the revolution input section, and the Rota section which has the magnet in which a high-speed revolution is carried out by this speed-increasing system, The stator section which has the coil which constitutes a magnetic circuit through the magnet and gap of this Rota section, If the electrical potential difference outputted from the coil of this stator section is restricted, it is prepared between the control circuit to which torque required for the input of the revolution input section is changed, and the revolution input section and a speed-increasing system and the above-mentioned torque exceeds a fixed value, it will come to have the clutch device in which the revolution input section is made to idle.

[0008] Thus, with the generator of this invention constituted, since a clutch device operates and the revolution input section idles when the revolution input section is turned too much at too much rate, an operator can generate electricity by lowering the rate of the revolution input section and turning at a proper rate.

[0009]

[Embodiment of the Invention] Hereafter, the example of a gestalt of operation of this invention is explained to a detail, referring to a drawing.

[0010] The base plate with which 1 shows the manual small generator by this invention as a whole in drawing 1 and drawing 2 , and 2 becomes that base, and 3 are wrap coverings about this base plate 2. The speed-increasing system which accelerates the revolution inputted from the revolution input section on the base plate 2 in the condition of fitting in the interior of this covering 3, It has the Rota section which has the magnet in which a high-speed revolution is carried out by this speed-increasing system, the stator section which has the coil which constitutes a magnetic circuit through the magnet and gap of this Rota section, and

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[0011] When a speed-increasing system is explained first, this speed-increasing system has the revolution input gear 4 and the accelerating gear 5, and is constituted. This revolution input gear 4 and the accelerating gear 5 are supported to revolve by the base plate 2 pivotable at the fixed shafts 6 and 7 by which set-up immobilization was carried out, respectively.

[0012] The handle 8 as the revolution input section is attached to the revolution input gear 4 through the clutch device 20. This handle 8 becomes by the fastener 9

attached to the fixed shaft 6 pivotable with the revolution input gear 4, and the lever 10 prolonged in the direction of a periphery from this fastener 9, a knob 11 is formed in the point of this lever 10, and the revolution input gear 4 rotates to this and one by having this knob 11 by hand and turning a handle 8. In addition, in this handle 8, to the fastener 9, 180-degree clinch is possible for a lever 10, and it is made by this by using a shaft 12 as the supporting point with the structure which can contain the part of a knob 11.

[0013] The clutch device 20 constituted between this handle 8 and the revolution input gear 4 is explained in detail later.

[0014] It comes to form minor diameter gear section 5a and major-diameter gear section 5b in one, and minor diameter gear section 5a gears with the revolution input gear 4, on the other hand, major-diameter gear section 5b gears with the gear 14 of the Rota section, and the accelerating gear 5 has the work which the revolution of the revolution input gear 4 is accelerated dozens times, and is transmitted to the Rota section.

[0015] The Rota section resembles the magnet 16 of the shape of a ring fixed to the gear 14 supported to revolve pivotable at the fixed shaft 13 by which set-up immobilization was carried out, this gear 14 and the disc-like revolution yoke 15 which rotates to one, and this revolution yoke 15 by the base plate 2, and is constituted more. In addition, in the generator 1 of this example, up and down, 2 sets counters and the revolution yoke 15 and magnet 16 of this Rota section are formed.

[0016] Two or more pole magnetization of N pole and the south pole is carried out by turns in that hand of cut, the magnet 16 of this Rota section counters in this magnet 16 and the axial direction (the direction of a revolving shaft), and the stator section is arranged.

[0017] This stator section comes to have the above-mentioned magnet 16 and the coil 18 which constitutes a magnetic circuit through the gap of the axial direction on the circuit board 17. If plurality is arranged in the hand of cut of a magnet 16 and the high-speed revolution of the magnet 16 of the Rota section is carried out, by the magnetic action between a magnet 16 and a coil 18, electromotive force will arise in a coil 18 and, as for this coil 18, a generation of electrical energy will be performed.

[0018] Especially in the generator 1 constituted, the clutch device 20 for suppressing too much revolution input is established by this example between the handles 8 and the revolution input gears 4 of a speed-increasing system which are the revolution input section like the above.

[0019] This clutch device 20 comes to have the clutch plate 21 attached to the fixed shaft 6 pivotable between the fastener 9 of a handle 8, and the revolution input gear 4. As this clutch plate 21 rotates to a handle 8 and one and it is shown in that underside side at drawing 3, projection formation of two or more projections 22 is carried out at equal intervals in the hoop direction.

[0020] As shown in the revolution input gear 4 at drawing 4 corresponding to this, the hole 23 of the same number is formed in the hoop direction at equal intervals, and the projection 22 of the above-mentioned clutch plate 21 engages with this hole 23. In addition, as shown in drawing 5 here, the projection 22 of a clutch plate 21 is formed in the hand of cut of a clutch plate 21 at the projection configuration which becomes circular.

[0021] Between the fastener 9 of a handle 8, and the clutch plate 21, the wave washer 24 is inserted as an elastic member, and it deflects in the direction in which

a clutch plate 21 is pushed against down [4], i.e., a revolution input gear, by the elastic force of this wave washer 24, and has the structure where engagement in the projection 22 of a clutch plate 21 and the hole 23 of the revolution input gear 4 is maintained by this.

[0022] Thus, in the usual condition, the projection 22 of a clutch plate 21 and the hole 23 of the revolution input gear 4 are being engaged, if a handle 8 is turned for this reason, the revolution input gear 4 will rotate to this and one, and a generation of electrical energy will be performed to them.

[0023] And when a handle 8 is turned with too much rotational speed, the clutch device 20 operates. According to namely, the force which a clutch plate 21 tends to rotate too much to the revolution input gear 4 to a handle 8 and one The wave washer 24 bends and the projection 22 of a clutch plate 21 separates from the hole 23 of the revolution input gear 4 (it separates from projection 22 from a hole 23 smoothly by being formed in the hand of cut of a clutch plate 21 at the projection configuration which becomes circular, as shown in drawing 5 at this time). For this reason, it operates so that a handle 8 may idle to the revolution input gear 4.

[0024] In this actuation, the clutch device 20 operates with combination with the control circuit constituted on the circuit board in a generator.

[0025] This control circuit is shown in drawing 6 . In this circuit, the electrical potential difference (three-phase-circuit electrical potential difference according to three coils in this case) generated with the coil 18 is rectified by direct current voltage for the diode of the rectification section 30, by DC-DC converter 31, a down convert is carried out and this electrical potential difference is outputted to 5V.

[0026] In this example, the voltage-limiting section 32 is formed between the rectification section 30 and DC-DC converter 31 in this circuit. This voltage-limiting section 32 is zener diode D1. Transistor Q1 It comes to have and a rectification electrical potential difference is zener diode D1. When the set-up electrical potential difference is reached, it is a transistor Q1. When many currents flow, coil resistance increases and the internal voltage drop by coil resistance becomes large, and it operates so that an electrical potential difference may be restricted.

[0027] That is, when it generates electricity by turning a handle 8, it is zener diode D1 about the electrical potential difference on which a rectification electrical potential difference occurs in proportion to the rotational frequency of a handle as shown in drawing 7 , and the voltage-limiting section 32 operates here. When it is set as 14V, it is a transistor Q1 by actuation of the voltage-limiting section 32 in the place where the rectification electrical potential difference became 14V. Many currents flow and an electrical potential difference is restricted.

[0028] Thus, if an electrical potential difference is restricted, the force of the sense in which a coil current bars a revolution of increase and a magnet will become large, and, for this reason, torque required for the revolution input of a handle 8 will become large.

[0029] That is, if the rotational frequency of a handle exceeds 120 which is a proper rotational frequency - 180rpm as shown in drawing 8 , torque rapidly required for the revolution input of a handle 8 will become large, that is, actuation of turning a handle 8 becomes heavy.

[0030] If the operating point of the clutch device 20 is about set as 1.5kgcm(s) here, it will be in the condition that the projection 22 of a clutch plate 21 separates from the hole 23 of the revolution input gear 4 in the place where the above-mentioned torque exceeded 1.5kgcm(s), and a handle 8 idles, and a generation of electrical energy will be suspended.

[0031] And when it comes to such a condition, an operator notices having turned the handle 8 too much at too much rate, can lower the rate which turns a handle 8 and can continue a generation of electrical energy by 120 which is a proper rotational frequency - 180rpm.

[0032] Thus, since whether it is suitable can control too much revolution input intelligibly therefore with the generator 1 of this example if a handle 8 is turned with what speed, there is no possibility of the superfluous force joining the device section and damaging this. Moreover, since the input maximum rating electrical potential difference of DC-DC converter 31 is not exceeded, dependability can go up by the circuit section, and it is not necessary to make the input maximum rating electrical potential difference of DC-DC converter 31 high beyond the need here, and IC cost can be lowered. Furthermore, since generation of heat does not need to become large in the circuit section, a heat sink is unnecessary and it becomes advantageous to a miniaturization.

[0033] As mentioned above, although an example of the gestalt of operation of this invention was explained, it cannot be overemphasized that it is what can otherwise take various operation gestalten, without limiting this invention to the configuration of this example.

[0034]

[Effect of the Invention] If the revolution input section is turned with what speed with the generator of this invention as explained above, it is intelligible whether it is suitable. Therefore, since too much revolution input can be controlled, breakage of the device section or the circuit section can be prevented certainly, and a reliable generator can be offered.

TECHNICAL FIELD

[Field of the Invention] This invention relates to the configuration for controlling too much input in a manual small generator especially about a generator.

PRIOR ART

[Description of the Prior Art] The manual small generator put in practical use by the current general one is equipped with the speed-increasing system which accelerates the revolution inputted from the revolution input section, the Rota section which has the magnet in which a high-speed revolution is carried out by this speed-increasing system, and the stator section which has the coil which counters with the magnet of this Rota section and is arranged, and is constituted.

[0003] A speed-increasing system accelerates the revolution which came to combine two or more gears and was inputted from the revolution input section dozens times, and transmits it to the Rota section.

[0004] As for the magnet of the Rota section, N pole and the south pole are magnetized by turns by the hand of cut, on the other hand, plurality is arranged in a magnetic hand of cut, and the coil of the stator section constitutes the magnetic circuit between magnets.

[0005] And if the high-speed revolution of the magnet is carried out by the speed-increasing system, by the magnetic action between a magnet and a coil, electromotive force will arise in a coil and a generation of electrical energy will be performed.

EFFECT OF THE INVENTION

[Effect of the Invention] If the revolution input section is turned with what speed with the generator of this invention as explained above, it is intelligible whether it is suitable. Therefore, since too much revolution input can be controlled, breakage of the device section or the circuit section can be prevented certainly, and a reliable generator can be offered.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] With the conventional generator constituted like the above, when turning the revolution input section with what speed, it did not understand whether it would be suitable, therefore the revolution input section was turned too much at too much rate, the superfluous force joined the device section, and the operator had a possibility of damaging a mechanism element, or a superfluous electrical potential difference having joined the circuit section, and damaging a circuit. It makes as a technical problem that this invention cancels such a trouble.

MEANS

[Means for Solving the Problem] As what solves the above-mentioned technical problem, the generator of this invention The speed-increasing system which accelerates the revolution inputted from the revolution input section, and the Rota section which has the magnet in which a high-speed revolution is carried out by this speed-increasing system, The stator section which has the coil which constitutes a magnetic circuit through the magnet and gap of this Rota section, If the electrical potential difference outputted from the coil of this stator section is restricted, it is prepared between the control circuit to which torque required for the input of the revolution input section is changed, and the revolution input section and a speed-increasing system and the above-mentioned torque exceeds a fixed value, it will come to have the clutch device in which the revolution input section is made to idle.

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[0018] Especially in the generator 1 constituted, the clutch device 20 for suppressing too much revolution input is established by this example between the handles 8 and the revolution input gears 4 of a speed-increasing system which are the revolution input section like the above.

[0019] This clutch device 20 comes to have the clutch plate 21 attached to the fixed shaft 6 pivotable between the fastener 9 of a handle 8, and the revolution input gear 4. As this clutch plate 21 rotates to a handle 8 and one and it is shown in that underside side at drawing 3, projection formation of two or more projections 22 is carried out at equal intervals in the hoop direction.

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[0024] In this actuation, the clutch device 20 operates with combination with the control circuit constituted on the circuit board in a generator.

[0025] This control circuit is shown in drawing 6 . In this circuit, the electrical potential difference (three-phase-circuit electrical potential difference according to three coils in this case) generated with the coil 18 is rectified by direct current voltage for the diode of the rectification section 30, by DC-DC converter 31, a down convert is carried out and this electrical potential difference is outputted to 5V.

[0026] In this example, the voltage-limiting section 32 is formed between the rectification section 30 and DC-DC converter 31 in this circuit. This voltage-limiting section 32 is zener diode D1. Transistor Q1 It comes to have and a rectification electrical potential difference is zener diode D1. When the set-up electrical potential difference is reached, it is a transistor Q1. When many currents flow, coil resistance increases and the internal voltage drop by coil resistance becomes large, and it operates so that an electrical potential difference may be restricted.

[0027] That is, when it generates electricity by turning a handle 8, it is zener diode D1 about the electrical potential difference on which a rectification electrical potential difference occurs in proportion to the rotational frequency of a handle as shown in drawing 7 , and the voltage-limiting section 32 operates here. When it is set as 14V, it is a transistor Q1 by actuation of the voltage-limiting section 32 in the place where the rectification electrical potential difference became 14V. Many currents flow and an electrical potential difference is restricted.

[0028] Thus, if an electrical potential difference is restricted, the force of the sense in which a coil current bars a revolution of increase and a magnet will become large, and, for this reason, torque required for the revolution input of a handle 8 will become large.

[0029] That is, if the rotational frequency of a handle exceeds 120 which is a proper rotational frequency - 180rpm as shown in drawing 8 , torque rapidly required for the revolution input of a handle 8 will become large, that is, actuation

of turning a handle 8 becomes heavy.

[0030] If the operating point of the clutch device 20 is about set as 1.5kgcm(s) here, it will be in the condition that the projection 22 of a clutch plate 21 separates from the hole 23 of the revolution input gear 4 in the place where the above-mentioned torque exceeded 1.5kgcm(s), and a handle 8 idles, and a generation of electrical energy will be suspended.

[0031] And when it comes to such a condition, an operator notices having turned the handle 8 too much at too much rate, can lower the rate which turns a handle 8 and can continue a generation of electrical energy by 120 which is a proper rotational frequency - 180rpm.

[0032] Thus, since whether it is suitable can control too much revolution input intelligibly therefore with the generator 1 of this example if a handle 8 is turned with what speed, there is no possibility of the superfluous force joining the device section and damaging this. Moreover, since the input maximum rating electrical potential difference of DC-DC converter 31 is not exceeded, dependability can go up by the circuit section, and it is not necessary to make the input maximum rating electrical potential difference of DC-DC converter 31 high beyond the need here, and IC cost can be lowered. Furthermore, since generation of heat does not need to become large in the circuit section, a heat sink is unnecessary and it becomes advantageous to a miniaturization.

[0033] As mentioned above, although an example of the gestalt of operation of this invention was explained, it cannot be overemphasized that it is what can otherwise take various operation gestalten, without limiting this invention to the configuration of this example.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the vertical section side elevation of the generator by this invention.

[Drawing 2] It is a **** plan.

[Drawing 3] It is the bottom view of a **** clutch plate.

[Drawing 4] It is the plan of a **** revolution input gear.

[Drawing 5] It is drawing of longitudinal section of the important section of a **** clutch device.

[Drawing 6] It is the circuit diagram showing a **** control circuit.

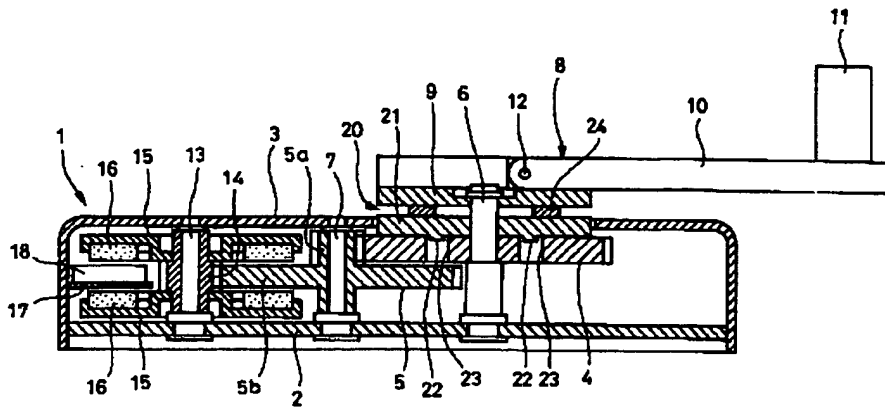
[Drawing 7] It is property drawing of a **** rectification electrical-potential-difference-rotational frequency.

[Drawing 8] It is property drawing of a **** torque-rotational frequency.

[Description of Notations]

1 [.. A handle (revolution input section), 16 / .. A magnet, 18 / .. A coil, 20 / .. A clutch device, 21 / .. A clutch plate, 22 / .. A projection, 23 / .. A hole, 24 / .. Wave washer] A generator, 4 .. A revolution input gear, 5 .. An accelerating gear, 8

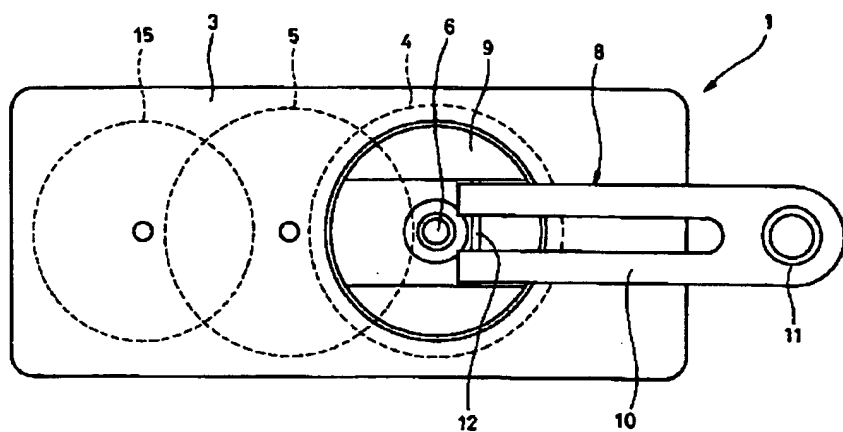
Drawing selection drawing 1



[Translation done.]

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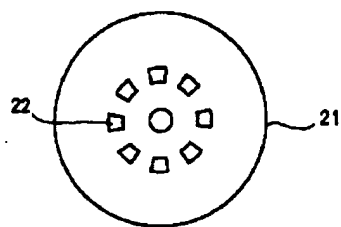
Drawing selection drawing 2



[Translation done.]

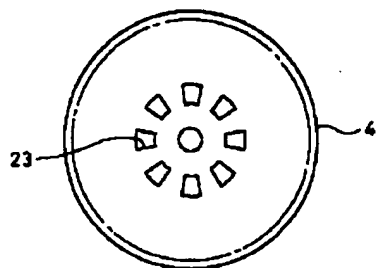
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Drawing selection drawing 3



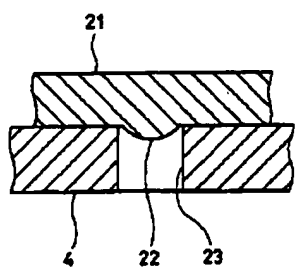
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Drawing selection drawing 4



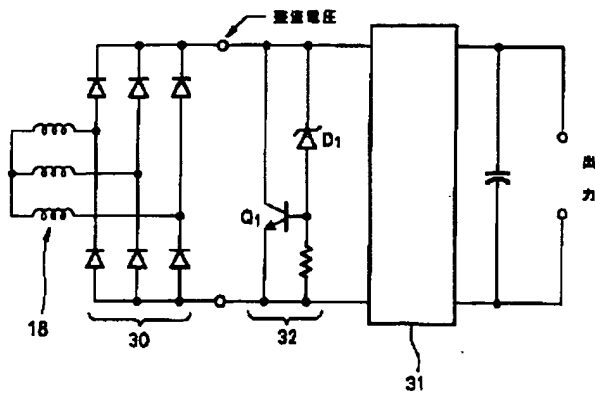
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Drawing selection drawing 5



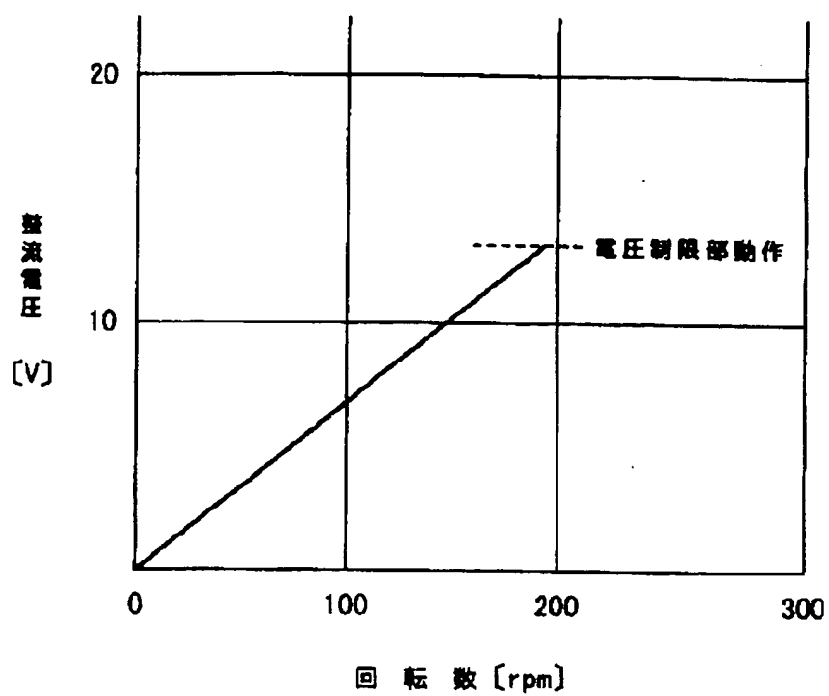
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Drawing selection drawing 6



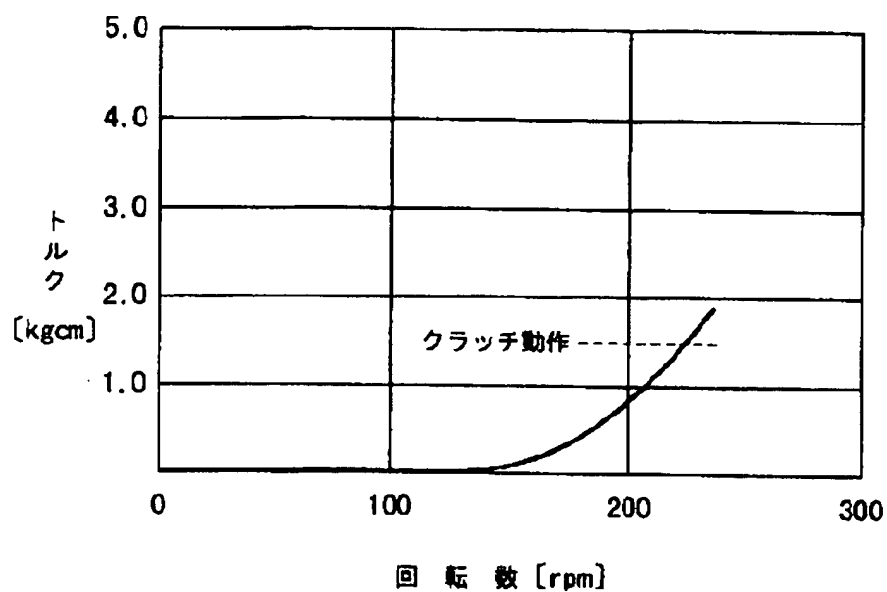
[Translation done.]

Drawing selection drawing 7



[Translation done.]

Drawing selection drawing 8



[Translation done.]